

G. E. THURBER.
 AUTOMATIC SAFETY DEVICE.
 APPLICATION FILED MAR. 3, 1911.

1,032,033.

Patented July 9, 1912.

3 SHEETS-SHEET 1.

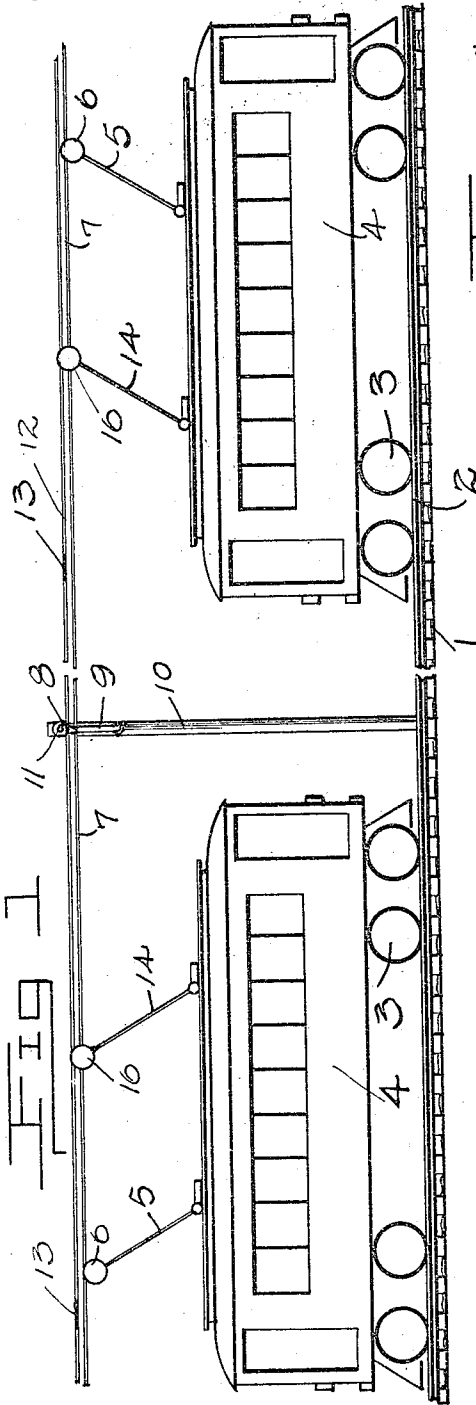


FIG 1

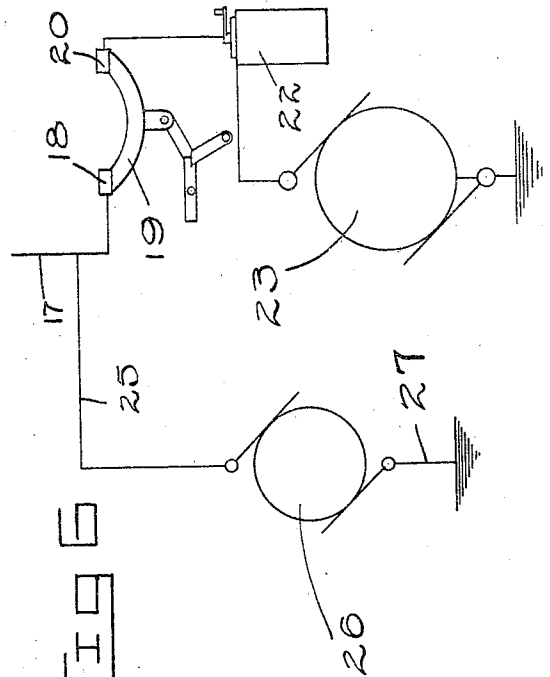
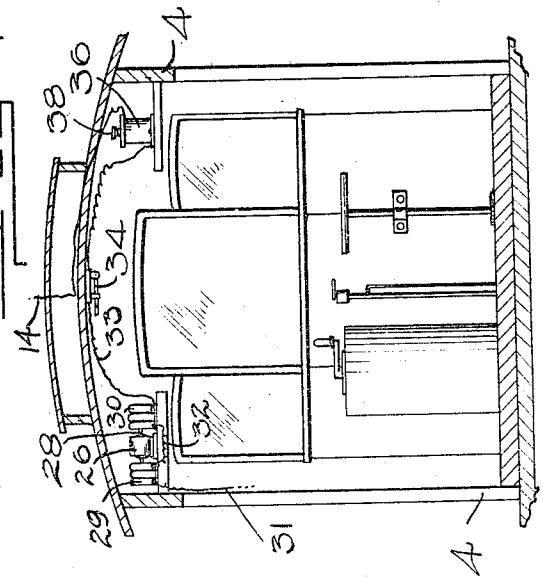


FIG 3

Witnesses
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 M. L. Neal.

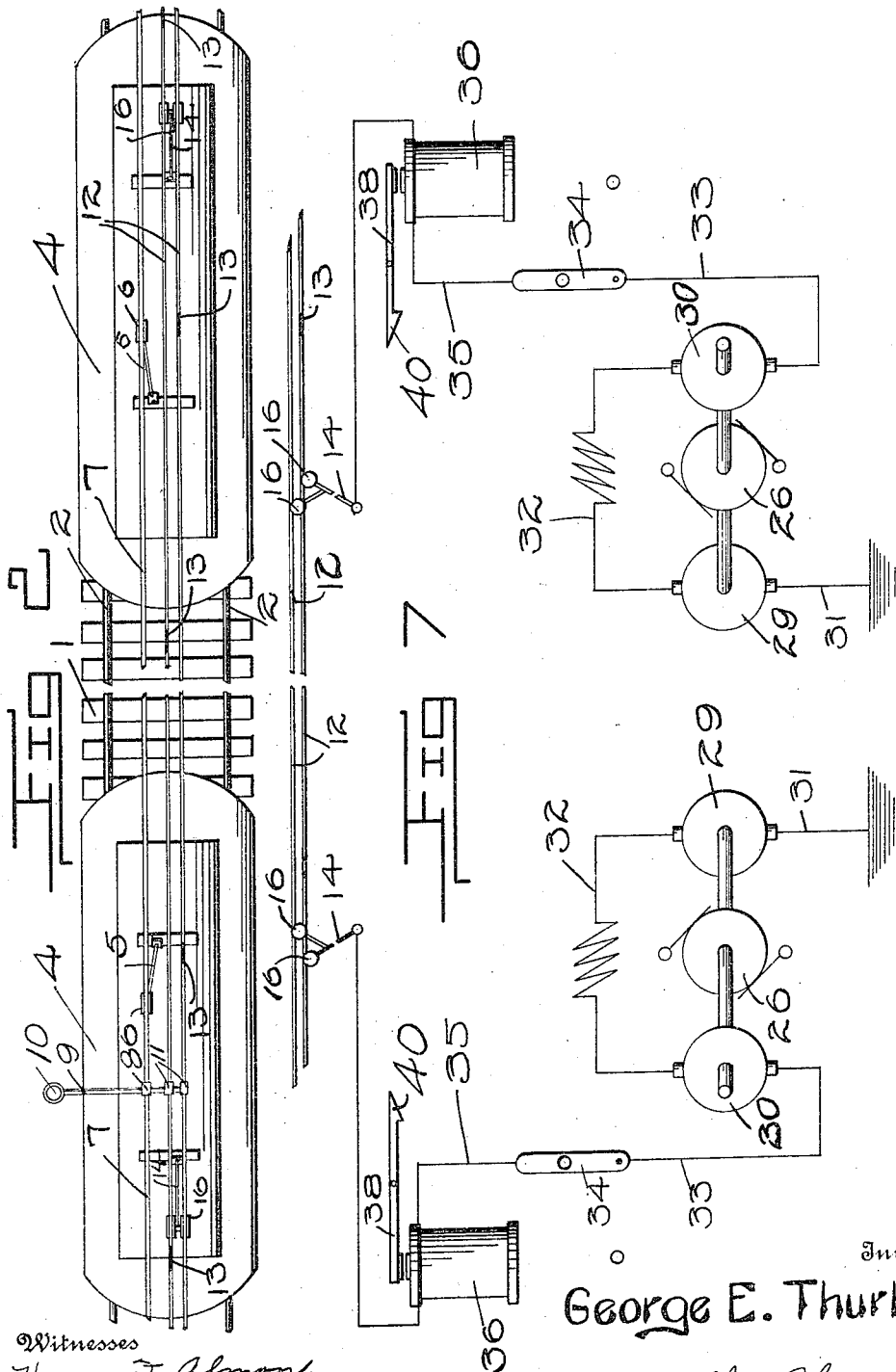
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 By Harry Ellis Chandler,
 Attorney

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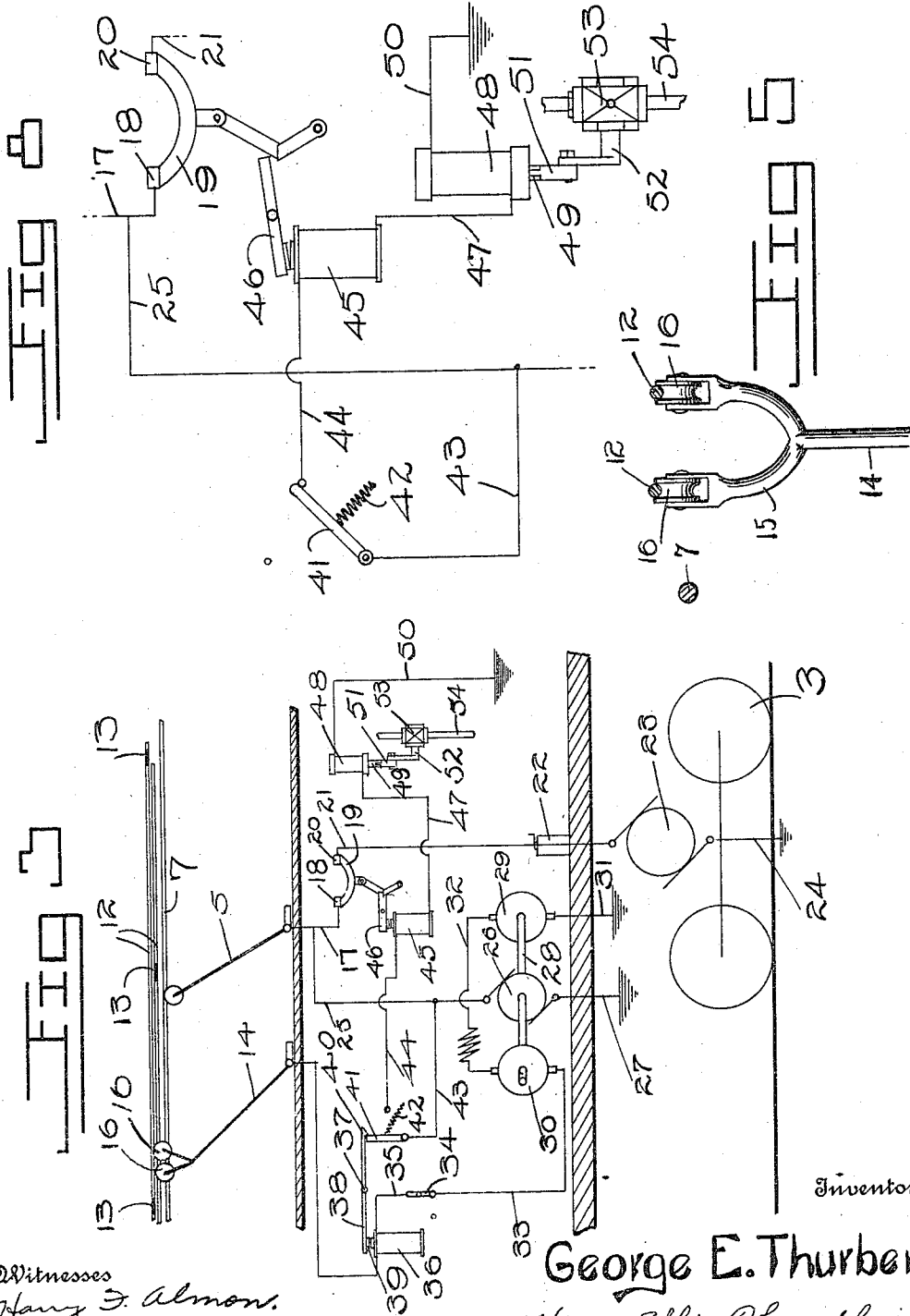
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3 SHEETS-SHEET 3.



Witnesses
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UNITED STATES PATENT OFFICE.

GEORGE E. THURBER, OF MICHIGAN CITY, INDIANA, ASSIGNOR OF ONE-HALF TO
EDWIN J. BOWER, OF MICHIGAN CITY, INDIANA.

AUTOMATIC SAFETY DEVICE.

1,032,033.

Specification of Letters Patent.

Patented July 9, 1912.

Application filed March 3, 1911. Serial No. 612,000.

To all whom it may concern:

Be it known that I, GEORGE E. THURBER, a citizen of the United States, residing at Michigan City, in the county of Laporte and State of Indiana, have invented certain new and useful Improvements in Automatic Safety Devices, of which the following is a specification.

My invention relates to improvements in automatic safety appliances for railroads, and has particular reference to an improved device especially adapted for use upon roads having electricity for their motive power.

The leading object of my invention is the provision of an improved appliance for use upon single track, electric roads which will serve to prevent collisions upon said roads.

A further object of the invention is the provision of an appliance of this character which may be readily attached to an ordinary car and which will serve to automatically cut off the power supply from the driving motor of the car and will further serve to apply the brakes to the car to stop the progress of both cars when two cars enter into the same block.

In the attainment of the objects of my invention, I have illustrated one of the physical embodiments of my invention as applied to an electric car, although it will be understood that the device is equally applicable to apply the brakes on a steam or otherwise propelled car so long as the electric power is supplied for the local circuit.

It will be further understood that I reserve the right to make any changes or modifications in the details of construction of my invention lying within the scope of my claims and that I may make said changes without departing from or exceeding the spirit of my invention.

Figure 1 represents a side elevation of a portion of the track way with a pair of cars mounted on the rails of the track way and equipped with my appliances. Fig. 2 represents a diagrammatic top plan view of the cars and attachments shown in Fig. 1. Fig. 3 represents a longitudinal vertical sectional view of the car with my improved appliance semi-diagrammatically shown therein. Fig. 4 represents a cross sectional view of the car. Fig. 5 represents an enlarged detail end view of the trolley. Fig. 6 represents a diagrammatic view of the two

motor circuits. Fig. 7 represents a diagrammatic view of the complete circuit of the supplemental or local circuit, and Fig. 8 represents a diagrammatic view of the course followed by the main current upon the releasing of the automatic closing switch occasioned by the closing of the local circuit.

In the drawings, the numeral 1 designates the road bed on which are mounted the rails 2 for the wheels 3 of the cars 4. Secured to the roof of each car is the main trolley 5 having its wheel 6 engaging the main current wire 7 supported by the insulated bracket 8 depending from the arm 9 of the post 10.

Depending from the arms 9 adjacent the brackets 8 are the brackets 11 supporting the supplemental wires 12, said wires being formed in sections or blocks separated from each other by the insulations 13 and the blocks being stepped with respect to each other, as most clearly shown in Fig. 2. Secured to the roof of the car is the second trolley 14 bearing at its upper end the U-shaped member or yoke 15 having on each arm a trolley wheel 16 engaging one of the wires 12.

Leading downward into the car from the trolley 5 is the wire 17 having its lower end secured to one of the contacts 18 of the circuit breaker 19 having a second contact 20. Secured to the contact 20 is a wire 21 leading through the controller 22 to the motor 23 for driving the car, said motor having a ground wire 24.

Leading from the wire 17 is the shunt wire 25 extending to the motor 26 having the ground connection 27. The shaft 28 of said motor projects from each side of the motor into the magneto-generators 29 and 30, the generator 29 having one of its terminals grounded by the wire 31, while the other terminal is connected in series by the wire 32 to the generator 30, a wire 33 leading from the free terminal of the generator 30.

The above described circuits of the car driving and generator driving motors are most clearly illustrated in the diagrammatic view thereof in Fig. 6, while the circuit of the generators is similarly set forth in Fig. 7. By reference to Fig. 7 it will be seen that the wire 33 leads to the manually operated switch 34, a wire 35 leading from said

switch to the magnet 36 and thence upward to the trolley 14 to connect the trolley wheels 16 with the generator.

When one of the trolley wheels 16 is upon the same block of the wire 12 as one of the supplemental trolley wheels 16 of another car the circuit of the current sent to the trolley by the generator will pass along said block of the wire and be grounded through the supplemental trolley and its circuit and generator on the other car.

To prevent neutralization of the currents from the two generators of the opposite cars I form the various generators of the different cars of different phases so that there will at all times be a current flowing from the ground of the generator of one car through the generators wiring and supplemental trolley of the one car, the block of wire and the trolley, wiring and generator of the other car when the trolleys of the two cars are on the same block.

It will be understood that said flow of the current will energize the electro-magnets 36 of the two cars. Pivoted on the studs 37 are the bars 38 having the armature portion 39 on one end adapted to be attracted by the magnet 36 to swing the bar on its pivot, and having on the other end the latch portion 40 normally retaining the switch member 41 open against the tension of the spring 42 which tends to close the switch. Upon the actuation of the magnet 36 the bar 38 will be swung to release the member 41 which will then close the circuit between the shunt wire 43 leading from the wire 25 and the wire 44.

The circuit thus closed will be most clearly understood by reference to Fig. 8, from which it will be seen that a portion of the current from the trolley 5 will pass through the wire 17 and the shunt wires 25 and 43 and through the switch 41 into the wire 44 leading to the electro-magnet 45. The current will energize said magnet 45 to cause it to draw down the armature 46 which is operatively connected with the circuit breaker 19 to move the latter to open the circuit of the motor and thus check the further movement of the car.

The current is conducted from the magnet 45 by the wire 47 leading to the solenoid 48, energizing said solenoid to draw inward its core 49, a ground wire 50 leading from the solenoid. Secured to the outer end of the core 49 is the link 51 connected to the arm 52 of the air brake valve 53, said valve being located in the air pipe 54 of the car and the inward drawing of the cord serving to open the valve to throw on the brakes. The car is thus automatically stopped and the current shut off by the entering of two cars into the same block, the stepped relation of the two supplemental wires or rails 12 insuring the stopping of the cars when they are at least half a block's

length apart. To start the car after it has been so stopped it is necessary to first open the switch 34 which will cut out the local current from the magnet 36, when the automatic closing switch 41 can be opened and locked in open position. The circuit breaker and the air brake valve are then moved to their correct position and the car may be started to move the same out of the block.

From the foregoing description taken in connection with the drawings, the construction and operation of my improved automatic safety appliance will be readily understood and it will be seen that I provide a device which can be readily installed in a car of ordinary construction which will be simple and efficient in operation and will be of construction and operation which can be comprehended by the motorman of the car and which will prevent the motorman from running his car in the block at full speed in disregard of the signal as frequently occurs when merely a visual or detonating alarm is provided for indicating the presence of the second car in the block.

It will be further understood that while I have illustrated my improved safety device as a combined signaling device, a cut out for the driving motor, and an automatic brake applying device, that it may be employed to perform any one of these functions separately or any desired combination of said functions.

While I have illustrated the device as used upon an electrically propelled car it is equally applicable for certain of its functions for use upon steam or otherwise propelled cars, in as much as the controlling current is entirely independent of the motive power and is supplied from a local source of electrical energy.

When the device is applied to other than electrically propelled cars the local current serves both to operate an indicating means as shown and to operate the air brake valve.

Although I have illustrated my invention as employing an overhead trolley wire 12 it will be understood that said wire may be placed in any desired position either at the side of or below the car so long as it is engaged by the supplemental trolleys of the car and while I have described the circuit as being closed only by the presence of the trolley of a second car on the same block of the controlling wire, it is apparent that any grounding of the wire 12 will suffice to cause the operation of the signaling and braking mechanism.

I claim:

1. In a safety appliance for railways, the combination with a car, of a motor for driving the same, an electric line for supplying current to the motor, a normally closed circuit breaker in said line, a branch line leading from the motor supply line,

an automatically closed switch for the branch line, means for holding the switch open, an electromagnet in the branch line operatively connected with the circuit breaker of the motor supply line to open said line, a partial electric circuit carried by the car, means for closing the circuit upon the approach of a second car, a local source of current for the circuit, and means operated by the closing of the local circuit for releasing the switch of the branch circuit to allow it to close, the branch circuit actuating the electro-magnet therein to operate the circuit breaker of the motor supply line.

2. The combination with a car, of a motor for driving the same, an electric circuit for supplying current to the said motor, a branch circuit leading from the main electric circuit and including a supplemental motor, a partial circuit on the car including generators, connections between the supplemental motor and the generators for operating the latter, electrically operated train controlling mechanism carried by the car, and located in the branch circuit, a spring switch in the branch circuit, means for holding the switch open against the closing force of the spring, and means operated by the closing of the partial circuit of the generators for releasing the holding means.

In testimony whereof I affix my signature, in the presence of two witnesses.

GEORGE E. THURBER.

Witnesses:

EDWIN J. BOWER,
WILLIAM SCHINEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."